Monitoring Relays
1-Phase True RMS AC/DC Over and Under Voltage
Types DUC01, PUC01

CARLO GAVAZZI

DUC01

PUC01

- **TRMS AC/DC over+under, over+over or under+under voltage monitoring relays**
- **Selection of measuring range by DIP-switches**
- **Measuring ranges from 2 to 500 V AC/DC**
- **Adjustable voltage on relative scale**
- **Adjustable hysteresis on relative scale**
- **Adjustable delay function (0.1 to 30 s)**
- **Programmable latching or inhibit at set level**
- **Output: 1 or 2 x 8 A SPDT relay N.D. or N.E. selectable**
- **For mounting on DIN-rail in accordance with DIN/EN 50 022 (DUC01) or plug-in module (PUC01)**
- **45 mm Euronorm housing (DUC01) or 36 mm plug-in module (PUC01)**
- **LED indication for relay, alarm and power supply ON**
- **Galvanically separated power supply**

Product Description

DUC01 and PUC01 are precise TRMS AC/DC over+under, over+over or under+under voltage (selectable by DIP-switch) monitoring relays. The voltage levels are adjustable separately and have their own time delay.
Owing to the built-in latch function, the ON-position of the relay output can be maintained. Inhibit function can be used to avoid relay operation when not desired (maintenance, transitions).
The LED's indicate the state of the alarm and the output relay.

Ordering Key

DUC 01 D B23 500V

- **Housing**
- **Function**
- **Type**
- **Item number**
- **Output**
- **Power supply**
- **Range**

Type Selection

Mounting	Output	Supply: 24 VDC	Supply: 24/48 VAC	Supply: 115/230 VAC
DIN-rail	DPDT	**DUC 01 D 724 500V**	**DUC 01 D B48 500V**	**DUC 01 D B23 500V**
Plug-in	SPDT	**PUC 01 C 724 500V**	**PUC 01 C B48 500V**	**PUC 01 C B23 500V**

Input Specifications

Input		
Voltage level	DUC01: Terminals Y1, Y2 PUC01: Terminals 5, 7	
Measuring ranges	**Internal resis.**	**Max. volt.**
2 to 20 V AC/DC	> 500 kΩ	350 V
5 to 50 V AC/DC	> 500 kΩ	350 V
20 to 200 V AC/DC	> 500 kΩ	600 V
50 to 500 V AC/DC	> 500 kΩ	600 V
Max. voltage for 1 s		1000 V
Note: The input voltage cannot raise over 300 VAC/DC with respect to ground (PUC01 only)		
Contact input		
DUC01	Terminals Z1, Y1	
PUC01	Terminals 8, 9	
Disabled	> 10 kΩ	
Enabled	< 500 Ω	
Latch disable	> 500 ms	

Output Specifications

Output	2 x SPDT relays (DUC01) 1 x SPDT relays (PUC01)
Rated insulation voltage	250 VAC
Contact ratings ($AgSnO_2$)	μ
Resistive loads AC 1	8 A @ 250 VAC
DC 12	5 A @ 24 VDC
Small inductive loads AC 15	2.5 A @ 250 VAC
DC 13	2.5 A @ 24 VDC
Mechanical life	≥ 30 x 10^6 operations
Electrical life	≥ 10^5 operations (at 8 A, 250 V, cos φ = 1)
Operating frequency	≤ 7200 operations/h
Dielectric strength	
Dielectric voltage	≥ 2 kVAC (rms)
Rated impulse withstand volt.	4 kV (1.2/50 μs)

Supply Specifications

Power supply	Overvoltage cat. III (IEC 60664, IEC 60038)	
Rated operational voltage through terminals:		
A1, A2 or A3, A2 (DUC01)		
2, 10 or 11, 10 (PUC01)		
724:	24 VDC ± 20%, insulated	
B48:	24/48 VAC ± 15% 45 to 65 Hz, insulated	
B23:	115/230 VAC ± 15% 45 to 65 Hz, insulated	
Dielectric voltage	**DC supply**	**AC supply**
Supply to input	2 kV	4 kV
Supply to output	4 kV	4 kV
Input to output	4 kV	4 kV
Rated operational power		
AC	5 VA	
DC	3 W	

General Specifications

Power ON delay	1 s ± 0.5 s or 6 s ± 0.5 s
Reaction time	(input signal variation from -20% to +20% or from +20% to -20% of set value)
Alarm ON delay	< 100 ms
Alarm OFF delay	< 100 ms
Accuracy	(15 min warm-up time)
Temperature drift	± 1000 ppm/°C
Delay ON alarm	± 10% on set value ± 50 ms
Repeatability	± 0.5% on full-scale
Indication for	
Power supply ON	LED, green
Alarm ON	LED, red (flashing 2 Hz during delay time)
Output relay ON	1 or 2 x LED, yellow
Environment	(EN 60529)
Degree of protection	IP 20
Pollution degree	3 (DUC01), 2 (PUC01)
Operating temperature	-20 to 60°C, R.H. < 95%
Storage temperature	-30 to 80°C, R.H. < 95%
Housing dimensions	
DIN-rail version	45 x 80 x 99.5 mm
Plug-in version	36 x 80 x 87 mm
Weight	Approx. 250 g
Screw terminals	
Tightening torque	Max. 0.5 Nm acc. to IEC 60947
CE-Marking	Yes

Mode of Operation

DUC01 and PUC01 monitor both AC and DC over+under, over+over or under+under voltage.

Example 1
(no contact input - under+over voltage - 2 x SPDT relays (1 x SPDT for PUC01))

DUC01: One relay operates when the voltage drops below the under voltage set point for more than the respective delay time. It releases when the voltage exceeds the set level plus the set hysteresis. The other relay operates when the voltage exceeds the over voltage set point for more than the respective delay time. It releases when the voltage drops below the set level minus hysteresis (the hysteresis is the same for both set levels).

PUC01: The relay operates when the voltage drops below the under voltage set level for more than the respective set delay time or when it exceeds the over voltage set level for more than the respective set delay time. The relay releases when the voltage exceeds the under voltage set level plus hysteresis and it drops below the over voltage set level minus hysteresis (the hysteresis is the same for both set levels).

Example 2
(latch enabled active - under+ under voltage - 2 x SPDT relays (1 x SPDT for PUC01))

DUC01: Each relay operates and latches when the voltage drops below the respective set level for more than the respective delay time. Provided that the voltage has exceeded the respective set level (see hysteresis), each relay releases when the contact input's connection is interrupted.

PUC01: The relay operates when the voltage drops below the higher set level for more than the respective delay time. Provided that the voltage has exceeded the respective set level plus hysteresis, the relay releases when the contact input is opened.

Example 3
(inhibit enable active - over+ over voltage - DPDT relay (1 x SPDT for PUC01))

Provided that the contact input is opened, the relay operates when the voltage exceeds the lower set level for more than the respective delay time. It releases when the voltage drops below the lower set level (see hysteresis) or when the contact input's pins are connected.

Note:
When the inhibit contact is opened, if the input signal is already in alarm position, the delay time needs to elapse before relay(s) activation.

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Function/Range/Level and Time Delay Setting

Selection of measuring range:
DIP-switch selector (1 to 2)

12
ON
2 to 20 V input range
5 to 50 V input range
20 to 200 V input range
50 to 500 V input range

Selection of function:
DIP-switch selector (3 to 6 and 1A, 2A)

3
Relay de-energized in normal condition.

Relay energized in normal condition.

4
Power ON delay 6 ± 0.5 s
Power ON delay 1 ± 0.5 s

5
Contact input as latch function enable. When the contact is closed the latch function is activated. The reset of the latch condition occurs when the contact is open or by power down.

Contact input as inhibit of alarm enable. When the contact is closed the relay remains in normal position even if alarm condition occurs

6
Set point 1 over voltage monitoring relay. The alarm condition occurs when voltage input is over the set point value.

Set point 1 under voltage monitoring relay. The alarm condition occurs when voltage input is under the set point value.

1A
ON
Set point 2 over voltage monitoring relay. The alarm condition occurs when voltage input is over the set point value.

Set point 2 under voltage monitoring relay. The alarm condition occurs when voltage input is under the set point value.

2A
ON
2 x SPDT relays (DUC01)

1 x DPDT relay (DUC01)

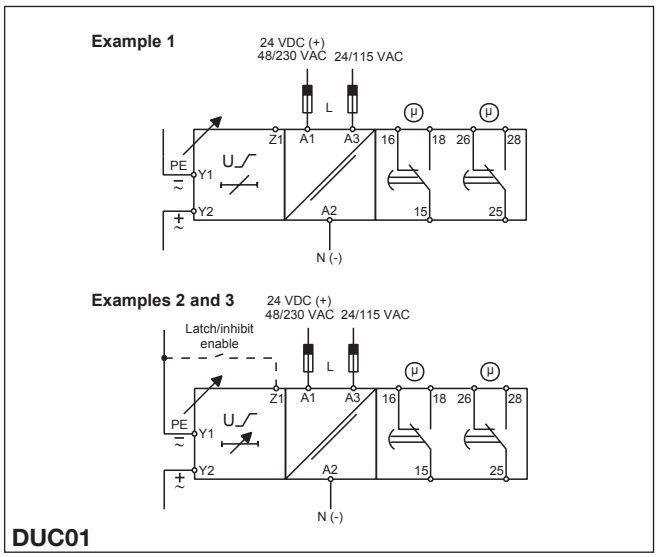
Selection of level and time delay:

Upper knob:
Setting of hysteresis on relative scale: 0 to 30% on set value.

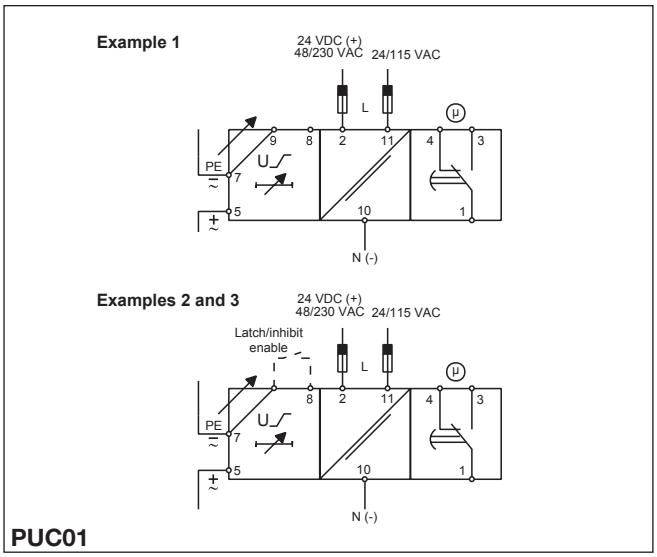
Centre knobs:
Current level setting on relative scale: 10 to 110% on full scale.

Lower knobs:
Setting of delay on alarm time on absolute scale (0.1 to 30 s).

Wiring Diagrams



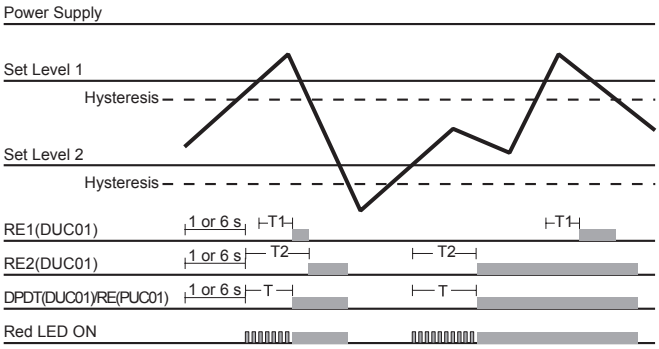
DUC01



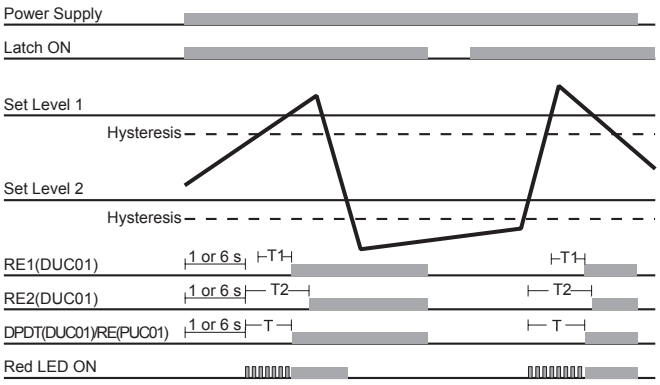
PUC01

Operation Diagrams

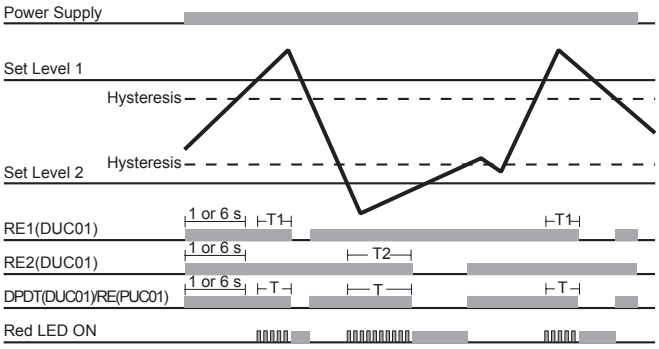
Over+over voltage



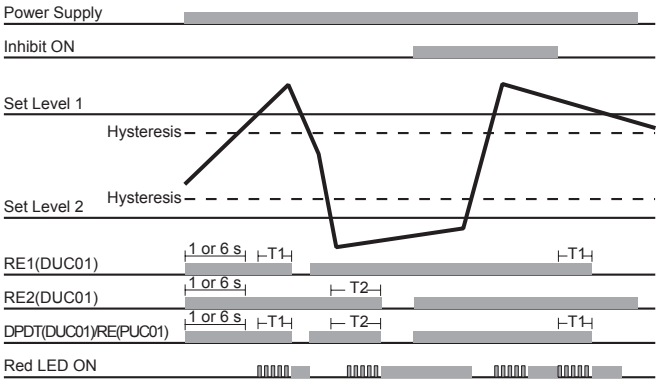
Over+over voltage - Latch



Over+under voltage - N.E. relay(s)



Over+under voltage - Inhibit - N.E. relay(s)



Under+under voltage